

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Claims 1-6 have been canceled in favor of new claims 7-12. Support for the amendments is provided for example in the original claims and the specification on page 14, line 28, through page 16, line 26.

Claims 1 and 4-6 were rejected, under 35 USC § 102(b), as being anticipated by Kitahara (US 2002/0061051). Claim 2 was rejected, under 35 USC § 103(a), as being unpatentable over Kitahara in view of Kroeger et al. (US 6,671,340). Claim 3 was rejected, under 35 USC § 103(a), as being unpatentable over Kitahara in view of Tesfai et al. (US 6,873,651). To the extent these rejections may be deemed applicable to new claims 7-12, the Applicant respectfully traverses based on the points set forth below.

Claim 7 recites features of canceled claims 1 and 2 and defines a radio transmission apparatus that assigns weights to spread carrier signals such that the weighting factors secure orthogonality among spreading codes when a radio reception apparatus performs despreading using factors to obtain maximal ratio combining. The claimed subject matter provides an advantage of compensating for a loss of orthogonality in a communication propagation path and maintaining a magnitude relationship of the received signal levels so as to improve the SNR of the received signals and, thereby, reduce interference from other users (see specification page 16, lines 24-26, and page 17, lines 4-19). Additionally, the claimed subject matter reduces the amount of calculations the radio reception apparatus must perform to receive the signals.

(References herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to the referenced embodiments.)

The Office Action acknowledges that Kitahara does not disclose the claimed subject matter of assigning weights to spread carrier signals such that the weighting factors secure orthogonality among spreading codes when a radio reception apparatus performs despreading using factors to obtain maximal ratio combining (see Office Action page 4, lines 3-6). To overcome this deficiency, the Office Action proposes that Kroeger discloses adaptively adjusting the weighting of a subcarrier to achieve maximal ratio combining (see page 4, lines 7-8).

However, the Applicant notes that Kroeger discloses a radio reception apparatus that coherently detects QPSK subcarrier symbols through soft-decision Viterbi decoding using channel state information to adaptively adjust the weighting applied to received soft symbols in a maximum ratio combining scheme (see Kroeger col. 8, lines 1-3 and 22-23).

Kroeger does not disclose a radio transmission apparatus that adaptively adjusts the weighting applied to spread subcarrier signals before their transmission. Thus, Kroeger does not disclose the claimed subject matter of a radio transmission apparatus that assigns weights to spread carrier signals, before their transmission, such that the weighting factors secure orthogonality among spreading codes when a radio reception apparatus performs despreading using factors to obtain maximal ratio combining.

Accordingly, the Applicant submits that the teachings of Kitahara and Kroeger, considered individually or in combination, do not render obvious the subject matter defined by new claim 7. Independent claim 11 similarly recites the above-mentioned subject matter

distinguishing apparatus claim 7 from the applied references, but with respect to a method.

Therefore, allowance of claims 7 and 11 and dependent claim 9 is deemed to be warranted.

New claim 8 recites features of canceled claims 1 and 3 and defines a radio transmission apparatus that assigns weights to spread carrier signals using weighting factors from which a signal having a maximum eigenvalue is extracted, when a radio reception apparatus decomposes a matrix into eigenvalues using a spreading factor as the size of the matrix, based on channel estimation value information for each subcarrier. This subject matter supports the same advantages identified above in connection with the subject matter of claim 7.

The Office Action acknowledges that Kitahara does not disclose the claimed subject matter of assigning weights to spread carrier signals using weighting factors from which a signal having a maximum eigenvalue is extracted, when a radio reception apparatus decomposes a matrix into eigenvalues using a spreading factor as the size of the matrix, based on channel estimation value information for each subcarrier (see Office Action page 4, last paragraph). To overcome this deficiency, the Office Action proposes that Tesfai discloses a receiving device that computes an eigenvector corresponding to a maximum eigenvalue to optimize an SNR (see page 5, lines 1-3).

Tesfai discloses a receiving device that computes an eigenvector corresponding to the maximum eigenvalue of a product of a receive filter matrix (see Tesfai, col. 2, lines 13-15). Additionally, Tesfai discloses that transmit filter sub-vectors, forming a transmit filter vector, are determined from sub-vectors of a principal eigenvector (see col. 2, lines 21-23).

However, Tesfai does not disclose the claimed subject matter of a matrix having a size of a subcarrier spreading factor and comprising subcarrier channel estimation information. Thus,

Tesfai cannot disclose the claimed subject matter of decomposing such a matrix into eigenvalues so as to extract a maximum eigenvalue and apply the weighting factors of the maximum eigenvalue to spread subcarrier signals.

Accordingly, the Applicant submits that the teachings of Kitahara and Tesfai, considered individually or in combination, do not render obvious the subject matter defined by new claim 8.

Independent claim 12 similarly recites the above-mentioned subject matter distinguishing apparatus claim 8 from the applied references, but with respect to a method. Therefore, allowance of claims 8 and 12 and dependent claim 10 is warranted.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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